Kindly amend the claims as follows:

1-15 Cancelled

16. (Original) An image recognition method for operating on shape data expressing an original region image to obtain shape data expressing a region image in which specific small regions have been eliminated, comprising repetitive execution of a series of steps of:

selectively determining respective regions of said original region image as constituting a set of small regions which are each to be subjected to a region combining operation;

selecting one of said set of small regions as a next small region which is to be subjected to said region combining operation;

for each of respective regions which are disposed immediately adjacent to said next small region, calculating a length of common boundary line with respect to said next small region, and determining one of said immediately adjacent regions which has a maximum value of said length of boundary line; and

combining said next small region with said adjacent region having the maximum length of common boundary line.

17. (Original) The image recognition method according to claim 16, wherein said step of determining said set of small regions which are each to be subjected to a region combining operation is performed based upon judgment of respective size values of each of said regions of said color image.

18. (Original) The image recognition method according to claim 16, wherein said step of determining said set of small regions which are each to be subjected to a region combining operation is performed by selecting each of its said regions of said color image having an area which is less than a predetermined threshold value.

19. (Original) The image recognition method according to claim 16, wherein said step of selecting one of said set of small regions as a next small region to be subjected to region combination is performed by selecting an arbitrary one of said set of small regions.

20. (Original) The image recognition method according to claim 16, wherein said step of selecting one of said set of small regions as a next small region to be subjected to region combination is performed by selecting the smallest one of said set of small regions.

21. (Original) The image recognition method according to claim 16, wherein said step of selecting one of said set of small regions as a next small region to be subjected to region combination is based upon the respective sizes of said set of small regions.

22. (Original) The image recognition method according to claim 16, wherein said step of selecting one of said set of small regions as a next small region to be subjected to region combination is based upon the respective total sizes of sets of regions which are located immediately adjacent to respective ones of said set of small regions.

23. (Currently amended) ~~The image recording method according to claim 1,~~ An image recognition method of processing image data of a color image, that is represented as respective sets of color attribute data of an array of pixels, to successively operate on each of said pixels as an object pixel in order to determine whether said object pixel is located on an edge within said color image, and thereby derive shape data expressing an edge image corresponding to said color image, the method comprising steps of:

expressing said sets of color attribute data of each of said pixels as respective color vectors, with each said color vector defined by a plurality of scalar values that are coordinates of an orthogonal color space;

for each of a plurality of predetermined edge directions, generating corresponding edge templates as an array of respectively predetermined numeric values;

extracting an array of color vectors as respective color vectors of a sub-array of said pixels, said sub-array of pixels being centered on said object pixel;

successively applying each of said edge templates to said array of color vectors in a predetermined array processing operation, to derive edge vectors respectively corresponding to said edge directions;

comparing the respective moduli of said derived edge vectors to obtain a value of edge strength for said object pixel, as a maximum value of modulus of. said edge vectors, and obtaining a possible edge direction for said object pixel as a direction corresponding to an edge vector having said maximum value of modulus;

judging whether said object pixel is located on an actual edge which is oriented in said possible edge direction, based upon comparing said edge strength of said object pixel with respective values of edge strength derived for pixels disposed adjacent to said object pixel;

~~further comprising a step of~~ converting said shape data expressing said edge image to shape data expressing a corresponding region image, and

repetitive execution of a series of steps of:

determining all regions of said original region image which each have a size that is below a predetermined threshold value, as constituting a set of small regions which are each to be subjected to region combination;

selecting one of said set of small regions as a next small region which is to be subjected to said region combination;

for each of respective regions which are disposed immediately adjacent to said next small region, calculating a length of common boundary line with respect to said next small region, and determining one of said immediately adjacent regions which has a maximum value of said length of boundary line; and

combining said next small region with said adjacent region having the maximum length of common boundary line.

24. (Currently amended) ~~The image recording method according to claim 6,~~ An image recognition method of processing image data of a color image, that is represented as respective sets of color attribute data of an array of pixels, to successively operate on each of said pixels as an object pixel in order to determine whether said object pixel is located on an edge within said color image, and thereby derive shape data expressing an edge image corresponding to said color image, the method comprising steps of:

expressing said sets of color attribute data of each of said pixels as respective color vectors, with each said color vector defined by a plurality of scalar values which are coordinates of an orthogonal color space;

for each of a plurality of predetermined edge directions, generating corresponding edge templates as an array of respectively predetermined numeric values;

extracting an array of color vectors as respective color vectors of a sub- array of said pixels, said sub-array of pixels being centered on said object pixel;

successively applying each of said edge templates to said array of color vectors in a predetermined array processing operation, to derive edge vectors respectively corresponding to said edge directions;

comparing the respective moduli of said derived edge vectors to obtain a value of edge strength for said object pixel, as a maximum value of modulus of. said edge vectors, and obtaining a possible edge direction for said object pixel as a direction corresponding to an edge vector having said maximum value of modulus; and

judging whether said object pixel is located on an actual edge which is oriented in said possible edge direction, based upon comparing said edge strength of said object pixel with respective values of edge strength derived for pixels disposed adjacent to said object pixel;

wherein said step of expressing said sets of color attribute data as respective color vectors comprises:

performing a transform processing operation on each of said sets of color attribute data to derive a corresponding plurality of scalar values which constitute a set of coordinates of a predetermined color space;

~~further comprising a step of~~ converting said shape data expressing said edge image to shape data expressing a corresponding region image, and

repetitive execution of a series of steps of:

determining all regions of said original region image which each have a size that is below a predetermined threshold value, as constituting a set of small regions which are each to be subjected to region combination;

selecting one of said set of small regions as a next small region which is to be subjected to said region combination;

for each of respective regions which are disposed immediately adjacent to said next small region, calculating a length of common boundary line with respect to said next small region, and determining one of said immediately adjacent regions which has a maximum value of said length of boundary line; and

combining said next small region with said adjacent region having the maximum length of common boundary line.

25-38 Cancelled

39. (Original) An image recognition apparatus for operating on shape data expressing an original region image to obtain shape data expressing a region image in which specific small regions have been eliminated, comprising:

small region detection means for selectively determining respective regions of said original region image as constituting a set of small regions which are each to be subjected to region combination;

region combination determining means for selecting one of said set of small regions as a next small region which is to be subjected to said region combination; and,

region combining means for calculating respective values of common boundary line between said next small region and each of the regions which are located immediately adjacent to said next small region, for determining one of said immediately adjacent regions which has a maximum value of said length of boundary line, and for combining said next small region with said adjacent region having the maximum length of common boundary line.

40. (Original) The image recognition apparatus according to claim 39, wherein said small region detection means comprises means for determining said set of small regions which are each to be subjected to a region combining operation based upon judgement of respective size values of each of said regions of said color image.

41. (Original) The image recognition apparatus according to claim 39, wherein said region combination determining means comprises means for determining one of said set of small regions as said next small region to be subjected to region combination, by selecting an arbitrary one of said set of small regions.

42. (Original) The image recognition apparatus according to claim 39, wherein said region combination determining means determines one of said set of small regions, as said next small region to be subjected to region combination, by selecting the smallest one of said set of small regions.

43. (Original) The image recognition apparatus according to claim 39, wherein said region combination determining means determines one of said set of small regions, as said next small region to be subjected to region combination, based upon the respective sizes of said set of small regions.

44. (Original) The image recognition apparatus according to claim 39, wherein said region combination determining means determines one of said set of small regions, as said next small region to be subjected to region combination, based upon the respective total sizes of sets of regions which are located immediately adjacent to respective ones of said set of small regions.

45. (Original) The image recording apparatus according to claim 39, wherein said small region detection means comprises means for selecting respective ones of said regions of the original region image that are smaller than a predetermined threshold value as said small regions which are to be subjected to region combination.

46. (Currently Amended) An image recognition apparatus for processing image data of a color image, that is represented as respective sets of color attribute data of an array of pixels, to successively operate on each of said pixels as an object pixel in order to determine whether said object pixel is located on an edge within said color image, and thereby derive shape data-expressing an edge image corresponding to said color image, the apparatus comprising:

color vector generating means for expressing said sets of color attribute data of each of said pixels as respective color vectors, with each said color vector in the form of an array of a plurality of scalar values which are coordinates of an orthogonal color space;

edge template application means for generating a plurality of edge templates each formed of an array of respectively predetermined numeric values, with said edge templates corresponding to respective ones of a plurality of predetermined edge directions, thereby extracting an array of color vectors as respective color vectors of a sub-array of said pixels, with said sub-array of pixels being centered on said object pixel, and successively applying each of said edge templates to said array of color vectors in a predetermined array processing operation, to derive edge vectors respectively corresponding to said edge directions;

edge pixel determining means for comparing the respective moduli of said derived edge vectors to obtain a value of edge strength for said object pixel, as a maximum value of modulus of said edge vectors, thereby enabling the identification of a possible edge direction for said object pixel as a direction corresponding to an edge vector having said maximum value of modulus, and for judging whether said object pixel is located on an actual edge that is oriented in said possible edge direction, based upon comparing said edge strength of said object pixel with respective values of edge strength derived for pixels disposed adjacent to said object pixel; ~~The image recording apparatus according to claim 25 further comprising~~:

means for converting said shape data expressing said edge image to shape data expressing a region image in which respective regions are separately identified;

small region detection means for selectively determining respective regions of said region image as constituting a set of small regions which are each to be subjected to region combination;

region combination determining means for selecting one of said set of small regions as a next small region which is to be subjected to said region combination; and,

region combining means for calculating respective values of common boundary line between said next small region and each of the regions which are located immediately adjacent to said next small region, for determining one of said immediately adjacent regions which has a maximum value of said length of boundary line, and for combining said next small region with said immediately adjacent region having the maximum length of common boundary line.

47. The image recording apparatus according to claim ~~30~~ 46, further comprising:

means for converting said shape data expressing said edge image to shape data expressing a region image in which respective regions are separately identified;

small region detection means for selectively determining respective regions of said region image as constituting a set of small regions which are each to be subjected to region combination;

region combination determining means for selecting one of said set of small regions as a next small region which is to be subjected to said region combination; and,

region combining means for calculating respective values of common boundary line between said next small region and each of the regions which are located immediately adjacent to said next small region, for determining one of said immediately adjacent regions which has a maximum value of said length of boundary line, and for combining said next small region with said immediately adjacent region having the maximum length of common boundary line.